Tactical Agriculture (TAg) In New York State: On-Farm IPM Education in Field Corn, Alfalfa, Soybeans and Vegetables

Project Leaders:
Julianne Dennis, Western NY Area IPM Educator, Livestock and Field Crops
Kenneth Wise, Eastern NY Area IPM Educator, Livestock and Field Crops
Abby Seaman, Western NY Area IPM Educator, Vegetable Crops
Mike Stanyard and Nancy Glazier, NWNY Dairy and Field Crops Team
Jeff Miller, Oneida County Field Crops Extension Educator
Jen Beckman, Lewis County Field Crops Extension Educator
Mike Dennis, Seneca County Extension Educator
Dean Sprague, Allegany, Cattaraugus, and Chautauqua County Field Crops Extension Educator
Chuck Kyle, Onondaga County Extension Educator

Cooperators:
J. Keith Waldron, NYS IPM Livestock and Field Crops Coordinator
Dairy, Field Crop, and Vegetable Producers in 10 counties in New York

Abstract:
The Tactical Agriculture (TAg) program is an experiential, hands-on training program designed to teach integrated pest and crop management concepts to field crop producers and other agribusiness personnel. The TAg program, which has been active in New York State since 1990, teaches field crop producers to better manage field crops, protect the environment and reduce health risks associated with production agriculture. Participants are actively engaged in a growing-season-long educational program that discusses critical pest and crop management issues that arise during the growing season and reinforces the learning experience with the timely collection of data from their fields during the growing season. In 2006, 81 producers in 10 counties in New York State participated in TAg teams covering Integrated Pest Management and Integrated Crop Management topics in field corn, alfalfa and other hay crops, soybeans, and vegetables.

Background and Justification:
Sound crop and pest management is critical to economical and efficient field crop production in New York State. The diverse landscape of New York State provides a variety of environmental conditions that foster different crop production and pest management challenges and provides opportunities for locally based and locally adapted Integrated Pest Management (IPM) and Integrated Crop Management (ICM) training. Many growers have indicated that they would like to learn more about Integrated Crop and Pest Management as a way to increase profits while protecting the environment. The Tactical Agriculture program (TAg) was initiated in the early 1990s to help growers learn how to improve their crop and pest management. TAg is an intensive, on-farm, growing-season-long, educational program that brings together Cooperative Extension educators, field crop producers, and agribusiness personnel to teach, learn, and implement IPM and ICM practices. The experiential hands-on educational philosophy is the foundation of the TAg program approach. TAg builds on the philosophy that a participant learning a new IPM or ICM tactic by hearing, demonstrating, discussing, and practicing new

concepts will more likely retain the information and adopt the practice when the information is reinforced throughout the growing season.

A TAg team typically consists of 4 to 8 producers and agribusiness personnel from a local area. TAg groups are comprised of farming neighbors who meet at a participant's farm to learn, discuss, demonstrate and practice the IPM and ICM methods**.** Meetings are scheduled approximately every 3 to 4 weeks to capitalize on the educational and management opportunities of the growing season. This schedule enables participants to observe, assess real field problems and discuss, select, and employ practical integrated solutions. Each TAg participant brings his or her own experience and expertise, which can enrich discussion and contribute to the groups' overall learning process. TAg participants enroll individual fields of corn, alfalfa, soybeans, and vegetables that serve as classrooms for TAg meetings.

On-farm education has been shown to increase participation and rates of adoption of new concepts and technologies (Wuest et al. 1995; Flora 1991). On-farm locations of TAg meetings provide ideal opportunities for direct observation of potential disease, insect, and weed pest outbreaks. The on-farm setting fulfills a producer's desire to see how an IPM and ICM method or new technology might work on his or her own farm. The small group educational design promotes learning and effective communication among TAg participants and Extension facilitators. Participants learn from each other what agronomic methods might work on their farm given their unique crops, soils, equipment, management, and other individual farm strengths and constraints.

The TAg program focuses on pest and crop issues over the entire growing season. The philosophy is to help participants understand and better anticipate potential pest and crop management needs, challenges, and opportunities. TAg programs help train participants to be proactive and more effectively manage those situations in real time during the growing season when the pest or crop issues are occurring. The TAg program teaches a decision-making process. Many IPM options are presented, and participants are taught how to assess pest levels, and how to evaluate need, appropriateness, timing, and effectiveness of various management interventions. Producers are encouraged to consider and use non-pesticide options but to also include judicious use of chemical control tactics when appropriate. In addition to a set of basic topics addressed, the flexible nature of TAg programs allows facilitators to address unique situations or local concerns. Designing TAg programs to meet local needs has great potential to dramatically increase the rate of adoption of IPM and ICM practices. For more information on TAg, please visit the following section of the NYS IPM website:
http://nysipm.cornell.edu/fieldcrops/tag/default.asp

CORN AND ALFALFA TAG: Dairy farmers with small herds and limited acreage generally rely solely upon themselves and their family members for implementation of farm practices. These farmers are very likely to implement new skills learned in TAg teams. In the case of Mennonite or Amish communities, distance to travel to a meeting is crucial in their decision to attend. The numbers of Amish and Mennonite farms in Seneca and Yates Counties continues to increase, thus targeting producers in these areas is a high priority. In Lewis County, many farmers are unaware of the damage that insects can cause and are also unaware of the scouting methods that can be used to determine need for selective insecticide use or other control methods. Producers

are interested in learning more about crop damage, especially as technology advances and as the array of available control options becomes more confusing.

Agricultural producers in sensitive watersheds are leading the way in nutrient management in NY due to stringent regulations, and financial incentives for implementing pest management plans are becoming more common. Several of the watersheds in the Finger Lakes can directly benefit from more judicious use of pesticides and other agricultural chemicals. TAg is an ideal vehicle for expanding extension outreach to crop and pest management training in these circumstances. The Conesus, Hemlock, and Skaneateles Lake Watersheds will be targeted in 2006 TAg team programs.

SOYBEAN TAG: Needs of agricultural producers constantly change. For many producers, soybeans fit well with their field crop rotations, provide a useful homegrown source of livestock feed, and offer a valuable cash crop option. In New York State, soybean acreage has increased over 4 fold since 1989 with an estimated 175,000 acres planted in 2004 (1989-2004 NYS Ag Stats). The trend in soybean acreage expansion is expected to continue as local markets are enhanced by availability of commercial roasters and oil processing plants. As soybean acreage has increased, so have producer questions regarding crop protection.

Until recently, soybean pest concerns have been minimal in the northeast, generally restricted to weeds, insect, disease and vertebrate pests affecting emergence, vegetative and reproductive phases of crop development. Given our Northeastern pest spectrum, many pest impacts have largely been minimized or avoided through an integrated approach based on selecting varieties for maturity group, disease resistance, and commercial commodity attributes and the timely implementation of sound agronomic practices including crop rotation. Regular field monitoring for pests and crop condition is encouraged to alert producers of potential problems (2006 Cornell Guide for Integrated Field Crop Management).

With the detection of soybean rust in the southeastern US in November of 2004, many experts speculated that rust could have a substantial impact on soybean pest management in the future. In response, producers anticipated a need to be proactive in learning how to manage the problem should rust appear in New York. A season-long on-farm soybean education program plays a major role in effectively communicating with small groups of producers about Asian soybean rust identification and management. In addition, soybean aphid, a pest that was first documented in New York in 2001, has also dramatically increased the need for sound IPM education for soybean producers.

Weed management in soybeans will continue to be an important area for educating producers. While initially intended to be used occasionally to clean up weeds from problem fields, estimates from field crop extension educators indicate that at least 90 % of soybeans planted are Roundup Ready varieties. This management technique appears to work adequately, but it is essential for IPM educators to be proactive in keeping soybean growers alert about the potential risk of developing herbicide resistance, shifts in the time of occurrence of weed species, and the availability of other Roundup Ready crops such as field corn and alfalfa could complicate the use of this technology in the near future. With two new exotic pests, numerous other occasionally severe pests, as well as ongoing weed management challenges, it is crucial to develop an

educational delivery method that Cooperative Extension and other personnel can easily use in IPM outreach in soybean production systems. Soybean producers in Genesee, Oneida, Ontario, and Seneca Counties will be targeted in 2006 Soybean TAg efforts.

FIELD CROP AND VEGETABLE TAG: The establishment of a local produce auction, expansion of farmers' markets, and success of roadside stands in Chautauqua and Cattaraugus Counties has raised the interest of Amish farmers along the border of these two counties in vegetable production. Several farms have taken a portion of their land that was in field crop production and started raising fresh market vegetables. This has presented two challenges to these farms. First, they have limited experience in growing vegetables commercially, creating the need for training on cultural and pest management practices on a variety of vegetable crops. Secondly, they need to make sure they have enough production from their field crops to meet the needs of the farm with reduced field crop acreage.

These Amish farmers have been seeking information to help with these two concerns from several sources including Agribusinesses, Cornell Cooperative Extension, and other producers. The structure of Tactical Agriculture Teams (TAg) brings these three groups together in an effective teaching and learning setting. Practices taught during TAg meetings can address both concerns for this group of producers. IPM and TAg can provide hands-on training in field crop and vegetable production and management. IPM principles will help these farms produce high-quality vegetables with minimum costs and minimal environmental impact while successfully balancing the field crop production requirements with the enhanced income potential from fresh market vegetable production for the farm. Additionally, hiring a scout for these farms will enhance the overall extension program and reinforce the IPM principles and concepts at TAg Meetings.

These new TAg programs are in direct response to suggestions from producers and extension educators indicating interest in expanded TAg efforts.

Objectives:

1. Customize and implement Tactical Agriculture programs (TAg teams) in Cattaraugus, Cayuga, Genesee, Lewis, Livingston, Oneida, Onondaga, Ontario, Seneca, and Yates Counties.
2. Measure the level of knowledge and the intentions to adopt IPM and ICM practices by producers participating in TAg teams.

Procedures:

TAg teams were implemented in Cattaraugus, Genesee, Lewis, Livingston, Oneida, Onondaga/Cauyga, Ontario, Seneca, and Yates Counties in 2006. Table 1 summarizes the number of farms, coordinating Cornell Cooperative Extension Educators, and acres targeted.

Table 1. Description of TAg Teams in 2006. Number of farms, crops targeted, and acreages impacted for each county program

County	Commodities covered	Local CCE TAg Team Coordinator	Number of Farms	Approximate number of Acres Targeted
Cattaraugus	Field crops, dairy, and vegetables	Dean Sprague	8	695 (total farm acres)
Genesee	Soybean	Mike Stanyard	5	685 (soybean acres)
Lewis	Field crops and dairy	Jen Beckman	5	1,280 (total farm acres)
Livingston	Field crops and dairy	Mike Stanyard and Nancy Glazier	4	805 (total farm acres)
Oneida	Soybeans	Jeff Miller	6	640 (soybean acres)
Onondaga/ Cayuga	Field crops	Chuck Kyle	6	4,900 (total farm acres)
Ontario	Soybeans	Mike Stanyard	5	1,035 (soybean acres)
Seneca	Field crops and dairy	Mike Dennis	8	560 (total acres)
Seneca	Soybeans	Mike Dennis	5	1,000 (soybean acres)
Yates	Field crops and dairy	Mike Stanyard	6	750 (total acres)

EDUCATIONAL DESIGN:
Each County identified key IPM and ICM educational needs of potential producer participants and organized and held timely meetings to address their topics. Meetings were scheduled relative to the needs and opportunities identified. Meetings were held to provide relevant teaching in critical educational moments during the growing season.

Mike Stanyard, with the assistance of Nancy Glazier, conducted traditional TAg teams in Yates County just south of Penn Yan and in Livingston County around Conesus Lake. The Yates County team was comprised of six Mennonite dairy producers. The Conesus Lake TAg consisted of five small dairies. Mike Dennis established a traditional TAg team with eight Amish dairy producers in Seneca County. Jen Beckman conducted a traditional TAg team in Lewis County for five small (60-100 cows and 90-350 acres), family-run dairy farms. Chuck Kyle and members of the Skaneateles Lake Watershed Agriculture Program (including Rick Newman) established a TAg team among 6 producers spanning Onondaga and Cayuga Counties. The producers involved run large and mid-sized field crop or dairy operations. Erin Hull scouted field for each producer weekly.

Mike Stanyard and Nancy Glazier also established soybean TAg teams in Genesee County and Ontario County. The soybean producers involved included full time field crop producers, dairy farmers, and producers with vegetables and strawberries. Jeff Miller coordinated a soybean TAg team in Oneida County. Many of the producers in Oneida County were very new to soybean crop production. Mike Dennis conducted a soybean TAg team in Seneca County, comprised of full time field crop producers and one organic field crop producer. Joi Strauss was the summer assistant who scouted fields for both TAg teams in Seneca County.

Dean Sprague coordinated the new Field Crop and Vegetable TAg program for a group of eight Amish farmers in Cattaraugus County.

Tables 2, 3, and 4 present the list of topics offered this summer in traditional TAg, soybean TAg, and field crop/vegetable TAg, respectively.

Table 2. Traditional TAg Topics. Overview of topics covered at Traditional TAg meetings in Lewis, Livingston, Onondaga/Cayuga, Seneca, and Yates Counties in 2006.

Meeting Time	Topics Taught
April	Manure spreader calibration, seed treatments, soil testing, pH testing, soil fertility
May	Alfalfa weevil management, alfalfa disease management
June	Early season corn pests, corn stand assessment, early season alfalfa pests, soil sampling
July	Potato leafhopper management, alfalfa harvest and crown counts, pest management record keeping
August	Corn rootworm management, scouting, and decision-making, alfalfa harvest issues, weed identification and management, fly management in dairy barns
September	Soil testing and soil fertility, harvest, season overview and planning for next year

Table 3. Soybean TAg Topics. Overview of topics covered at Soybean TAg meetings in Genesee, Oneida, Ontario, and Seneca Counties in 2006.

Meeting Time	Topics Taught
May	Early season insect pests, soybean rust update, planting: seeding rates and depth, soil sampling and soil fertility for soybean
June	Soybean stages of growth, plant population assessment - stand counts, seed corn maggot, slugs, early season disease pests: seedling rots and blights, soybean aphids, weed identification and management
July	Soybean stages of growth, soybean aphid identification and management, soybean rust and other foliar diseases (Septoria brown spot, downy mildew), white mold
August	Defoliating insects, soybean rust update, weed identification and management, white mold, farm-by-farm season-long pest management review
September	Management of pests of stored soybeans, soybean harvest issues, planning for next year's crop: crop rotation and variety selection

Table 4. Field Crops/Vegetable TAg Topics. Overview of topics covered at Field Crops/Vegetable TAg meetings in Cattaraugus County in 2006.

Meeting Time	Topics Taught
May	Introduction to IPM; early season pests in corn and hay crops: diseases, insects, and weeds; corn stand counts; early season vegetable scouting
July	European corn borer in sweet corn: identification, scouting, and

	management; weed management - preventing herbicide resistance; potato leafhopper management in alfalfa
August	Management of flies in dairy barns
August	Diseases of cucurbits and tomatoes, the season in review
October	Fall weed management, soil testing and soil fertility

FIELD SCOUTING: Weekly monitoring of one field of each crop for each participating farm helps producers document timely data on current crop condition and pest status. Scouting reports were shared with producers weekly, and scouting data was used as a basis for discussion at each TAg team meeting. Producers lean more and are more likely to adopt IPM and ICM practices when pest data collected from their own fields are presented. This information more fully engages participants in the learning and decision making process. Real data on pest and crop management issues from a producer's own farm is ultimately more convincing and effective at promoting behavioral changes than hypothetical examples. Obtaining field observations at regular intervals helped to reinforce to producers the value of scouting their other fields during the current season and all of their fields in the future. Summer assistants scouted fields weekly in all 10 TAg team programs.

EVALUATION OF THE PROGRAM:
Participants were asked to complete a pre-test and a post-test to document a baseline of participant's IPM / ICM knowledge and skill level prior to program participation and assess changes resulting from involvement with the TAg program. A post-season survey was also conducted to determine how many IPM or ICM practices participants planned to continue doing, on how many acres, and participants' suggestions for improving TAg efforts in their county.

Results and Discussion:
The Tactical Agriculture program has been a model for IPM and ICM information transfer in New York State for over 15 years. Ten TAg team programs were successfully implemented in 2006.

CORN AND ALFALFA TAG: The producers participating from Lewis, Livingston, Seneca, and Yates counties all manage small dairy farms. The educational needs of these producers included basic pest education and scout training at all stages of crop production for corn (silage and grain) and alfalfa. The producers in the Skaneateles Lake Watershed TAg program (overlapping Onondaga and Cayuga Counties) manage medium to large dairies or field crop operations. Their interests and needs were geared toward the development of pest management plans and improving pest management records keeping. The scout and the data she generated played a very large role in providing organized, thorough written reports weekly to each producer.

SOYBEAN TAG: Soybean producers in general responded very well to the soybean TAg program, although the audience needs varied greatly among the four teams. Many of the producers involved in Oneida County are growing soybeans for the first time, so the TAg program has been able to provide an extra benefit of background information for soybean crop production. The Seneca County team, on the other hand, was largely comprised of producers who have been growing soybeans since the 1980's. They have more of a "plant it and forget about it until harvest" approach, and turn out at meetings reflected this attitude. The Ontario County team was

comprised of a combination of veteran soybean producers and newcomers, and the discussions and camaraderie in this group were very beneficial to all members. Additionally, the producers on the Ontario County team grow a wide diversity of crops, and could share a great deal of insight regarding unique farm rotations. The Genesee County TAg team was comprised of dairy producers and field crop producers. Several producers had very small acreages of soybeans, and were able to learn a lot from their neighbors. An emphasis was placed on understanding plant growth stages at every meeting to help participants understand vulnerable stages in plant growth and development, and to correctly time management actions, if management was necessary.

Sentinel plots for early detection of soybean rust were located across New York State in 2006, and plants were sampled weekly for disease occurrence. Three of these sentinel plots were located on the farms of soybean TAg team participants (one in each of Genesse, Oneida, and Seneca counties). Additionally, two soybean rust sentinel plots were located on the farms of participants in the Skaneateles Lake Watershed TAg program, with one in Cayuga County and one in Onondaga County. Soybean aphid occurrence was also tracked in these plots, and initial efforts in soybean cyst nematode detection in NY were conducted at these sites. If soybean rust had been present in NY in 2006, our TAg teams would have played a key role in keeping other producers informed.

FIELD CROP AND VEGETABLE TAG: The Amish producers found the meetings to be very productive, and weekly scouting was beneficial. Scouting was the most helpful for the one member who grows alfalfa, and the least helpful to those growing primarily vegetables. It was very difficult to train a scout to recognize all of the insects and diseases that could potentially impact diverse plantings of vegetable crops.

The pest information gathered from scouting the TAg fields across New York during the growing season was used in other extension educational efforts across New York State, including the NYS IPM Weekly Field Crops Pest Report (http://nysipm.cornell.edu/fieldcrops/tag/pestrpt/default.asp). Information was also posted on county and regional program websites and included in Extension newsletters.

PERCEPTION OF THE TAG PROGRAM BY PRODUCERS: TAg participants provided very positive feedback regarding their TAg training experience. One hundred percent of the TAg participants agreed that the program helped them to better understand pest and crop management issues. Producer participants all indicated that they would recommend the program to other producers in their area. Specific comments are listed in the "Samples of Materials" section at the end of this report.

KNOWLEDGE AND ADOPTION OF IPM AND ICM: Results of the pre and post-testing indicated that TAg participants all increased their knowledge of IPM and ICM. Mean scores on pre and post tests are presented in Table 5.

Table 5. Pre and Post Test Scores. Mean scores on pre and post tests by county TAg program

County	Commodities covered	Mean Pre-test Score	Mean Post-test Score	Percent Improvement
Cattaraugus	Field crops, dairy, and vegetables	none	none [a]	
Genesee	Soybean	70%	87%	17%
Lewis	Field crops and dairy	35%	83%	48%
Livingston	Field crops and dairy	65%	83%	18%
Oneida	Soybeans	53%	80%	27%
Onondaga	Field crops	65%	74%	9% [b]
Ontario	Soybeans	82%	90%	8%
Seneca	Field crops and dairy	none	none [a]	
Seneca	Soybeans	57%	none [c]	
Yates	Field crops and dairy	50%	76%	26%

[a] Amish customs made these participants very reluctant to disclose written information

[b] Pest topics and records keeping only were covered in this program. Participant scores on pest topics increased, while questions regarding crop nutrient needs were still answered incorrectly in most cases.

[c] The initial producers who completed the pre test did not continue to attend, so the post-test scores would not be valid.

While knowledge of IPM and ICM is important, the long-term implementation of these practices is a more critical measure of program impact. After the completion of the TAg program, participants completed an exit survey or participated in interviews to indicate what IPM and ICM practices that they plan to implement.

IMPACTS:

TRADITIONAL TAG: All of the participants in the Yates and Livingston County teams highly agreed that this experience helped them understand the importance of pest and crop management issues on their farms. One "educational moment" of note from the Yates County team involved a side-by-side comparison of potato leafhopper (PLH) resistant alfalfa versus a susceptible variety on one producer's farm. These two fields were "off the beaten path" and had not been monitored after first cutting. When the team returned 30 days later, the PLH resistant alfalfa was green and tall, while the conventional alfalfa was bright yellow and only a foot tall.

While the Amish producers in Seneca County were willing to complete a pre-questionnaire to help identify topics needing attention, they completed it only because they were assured that results would remain confidential. The primary evaluation tool used for determining impacts was interaction at meetings and one-on-one follow-up conversations. Based on these evaluations, it is clear that awareness of and use of IPM techniques has increased as a result of the TAg program. In particular, the group accepted the use of threshold tables for monitoring populations of PLH and corn rootworm (CRW) as valuable tools to avoid or limit the use of pesticides. As a result of the CRW lesson and scouting, the use of insecticides will likely go down. In general, participants based decisions regarding whether to treat primarily on observing tactics being used on neighbor farms! This practice is changing.

Producers involved in the Skaneateles Lake Watershed TAg team found conducting corn stand counts, conducting alfalfa crown counts, and practicing corn rootworm scouting to be particularly useful. There was positive feedback about how helpful it was to see and learn about the pests in the field, but suggestions were made to spend more time at meetings actually practicing the scouting techniques. Post-test results indicated that more emphasis should have been placed on crop nutrient use, and suggestions from post surveys indicated that learning more about soil compaction was desired.

Prior to participation in the Lewis County TAg team, producers were not really sure what kind of damage various insect and weed pests caused. After TAg, producers are much more aware of the potential damage and yield loss possible from each. Producers appreciated learning about the insects and the discussion of management practices from someone other than a salesman. They especially appreciated the setting - it is much easier to lean in the field where you can actually see the insect and the damage. Surveys conducted following the TAg team demonstrate that non-participants are much more ignorant about the threats posed by pests. They are mor easily influenced by salesmen and are more likely to purchase seed protection they do not nee (corn rootworm protection) and less likely to spend extra money on crop protection that they do need (potato leafhopper resistant alfalfa).

SOYBEAN TAG: The program provided valuable information and served as a forum of discussion for a wide range of soybean producers. Emphasis was placed on educating participating producers about two new invasive pests of soybeans. Soybean aphids have been present in NY for several years, and occasional severe infestations have caused yield losses. However, many producers do not make management decisions based on field observations and economic thresholds. Soybean aphid identification, scouting, and management were major topics covered during soybean TAg. Although Asian soybean rust has not yet been detected in NY, producers were concerned about the possible occurrence of this disease. In our program evaluation, we emphasized these two pest problems with the following questions: Because of TAg, 1) Do you feel more knowledgeable about Asian soybean rust?; 2) Do you have an improved ability to scout for soybean diseases and to distinguish common diseases from rust?; 3) Are you more knowledgeable about whom to contact in case of the appearance of rust?; and 4) Are you more knowledgeable about soybean aphid life cycle, damage, and thresholds? All participants answered yes to all four questions. In the Oneida County soybean TAg program, Jeff Miller reported that no insecticides were applied to control aphids, and no fungicides were applied for disease control either by growers participating in the TAg team or those who received weekly emails of scouting results.

Complete surveys were not available from all soybean TAg participants, but of the participants surveyed, over 90% stated that they either “would” or “would try to” use the following practices:

- Use threshold tables and guidelines to make pest management decisions
- Develop a plan for IPM in soybeans
- Monitor populations of beneficial insects in soybean fields
- Scout for diseases: septoria brown spot, Asian soybean rust, downy mildew, white mold, and powdery mildew
- Make pest management decisions based on stand health, growth stage, and yield potential

FIELD CROP/VEGETABLE TAG: The culture of this Amish community precludes the use of written pre and post-test evaluations. Oral interviews and observations by the project leaders and cooperators were used to estimate participants' knowledge levels at the beginning and end of the programs. It is estimated that all participants raised their level of understanding of IPM and ICM principles from a low to moderate understanding to a high level of understanding.

As a result of these efforts, all eight farms now have a better understanding of not only IPM principles for pest control but of overall field crop and vegetable production practices. Five of the farms had never soil tested before and plan to do more regular testing. Going into this program, only two of the farms did any regular scouting for pests and none of them had written pest records from year to year. As a result of this program, five farms are now keeping written pest records, and all farms plan on regularly scouting their crops next season. The five farms that did not grow vegetables this season all state that they now better understand the issues and challenges involved in vegetable crop production. They are looking into marketing opportunities and niche markets before proceeding further. See Table 6 for IPM/ICM practices that participants will do or try to do in the future.

Table 6. Field Crop/Vegetable TAg Impacts. Planned implementation of IPM/ICM principles by program participants.

	Percent of participants who:		
IPM/ICM Practices	Will do	Will try	Will not do
Use IPM practices for fly control in the barn	4	4	0
Perform stand counts	5	3	0
Conduct spring and fall weed identification and surveys	6	2	0
Monitor for weed escapes from herbicides	8	0	0
Scout for diseases in vegetables	3	0	0
Time herbicide treatments carefully based on plant growth stage	5	3	0
Time fungicide treatments carefully based on plant growth stages and presence of diseases	3	5	0
Time insecticide treatments based on plant growth stages and threshold numbers of insects, and take weather conditions into consideration	6	2	0
Use economic thresholds to guide insect and disease management decisions	4	4	0
Make pest management decisions based on stand health, growth stage, and yield potential	7	1	0
Keep scouting records, records of management decisions, and records of management actions	5	1	2
Use threshold tables and guidelines	4	4	0
Prepare IPM scouting plan before the growing season begins	2	4	2
Collect reference material to help plan your IPM program	5	1	2
Consult your extension educator or IPM educator for new information	6	2	0
Conduct soil testing to determine proper fertilization needs	5	3	0

Use crop rotation to control weeds and diseases	4	2	2
Review the soil test results with your CCE Educator	5	3	0

Notes: All of these farms use cultivation in their weed control strategy and monitor for weed escapes. The two farms that say they will not keep records both feel they have few fields and can remember the history without writing anything down. These are also the farms that do not plan on collecting reference materials or preparing a scouting plan. The two farms that will not use crop rotations are both vegetable farms with small acreage that don't feel they have the space available to rotate as they would like.

One area that did stand out as needing more work was fly control in the barn. After the fly control workshop, a few farms started using fly baits with great success. However, they are putting the bait in less than ideal locations where the dead flies and spilled bait could be accessible to pets. Next year we will have a one-time workshop to build bait "traps" out of plastic gallon jugs to hang in the barns keeping the baits contained and out of reach. Building these "traps" was covered at the meeting; however, the Amish do not have plastic jugs readily available. Therefore, we will be providing the supplies.

Summary: The TAg programs in Cattaraugus, Genesee, Lewis, Livingston, Oneida, Onondaga/Cauyga, Ontario, Seneca, and Yates Counties in 2006 were successful at helping producers to learn and implement IPM and ICM philosophy and practices in their farming operations. A key aspect of the success of this method is educational opportunities personalized to a producer's specific farming environment combined with interactive and participatory learning. The TAg programs could not succeed without the dedicated efforts of local educators and scouts. Overwhelmingly, producers involved indicated receptiveness to the TAg approach and have show a willingness and desire to implement many of the IPM and ICM practices highlighted in the TAg programs.

Funding:
This project was supported through several funding sources:

- NYS IPM Agricultural Grants Program supported the TAg programs in Cattaraugus, Lewis, Livingston, Seneca, and Yates Counties
- Northeast Soybean Promotion Board supported the Soybean TAg programs in Genesee, Oneida, Ontario, and Seneca Counties
- Skaneateles Lake Watershed Agriculture Program supported the TAg program in Onondaga/Cayuga Counties

References:

Flora, B. F. 1991. Research Priorities for Sustainable Agriculture. Conference proceedings: Setting Priorities: Research, Practice and Policy for a More Sustainable Agriculture. Leopold Center for Sustainable Agriculture.

New York Agricultural Statistics Annual Bulletin. 2005. New York Agricultural Statistics Service. U.S. Department of Agriculture.

Wuest , S. B., Guy, S. O., Smith L. J. and Miller, B. C. 1995. On-Farm Tests as a Tool for Extension Programming. Journal of Extension 33: 4.

Samples of Materials:

QUOTATIONS FROM PARTICIPANTS:

From various TAg programs:

- Time well spent
- It was enjoyable getting together with area farmers
- Very good, learned a lot
- Very informative and positive attitude

From Soybean TAg programs:

- Examples of situations in which the TAg experience helped with a pest crop management or economic situation on your farm this season:
    - Able to tell now that disease situation was not rust but brown spot
    - Do not get overly concerned about the number of Japanese beetles
    - Aphids and white mold concerns - I scouted - very spotty, not a problem
    - Checked plant populations

PHOTOGRAPHS:

The Ontario County Soybean TAg team conducts stand counts

Jeff Miller and the Oneida County Soybean TAg team look at soybean aphids

A scenic view of one of the Amish farms in the Cattaraugus County Field Crop and Vegetable TAg team. (Photo courtesy of Mary Woodson)